

REMARKS

Initially, Applicants wish to thank the Examiner for his time spent with its undersigned representative during the telephone interview conducted on April 24, 2012. During this conversation, the rejections presented in the above-identified Office action were discussed as well as the limitations of the cited prior art and the subject matter of the then-pending claims. It was decided during this conversation that directing the claims to the subject matter of a cutting element or a rock bit comprising the same (e.g., rather than purely a composition of matter) would help in distinguishing over the prior art cited. Further, it was decided that it would be also helpful to include the combined engineered properties of the cermet material into the claims; namely, fracture toughness, thermal shock resistance, and wear resistance. Applicants have done this in the present Amendment.

In this Amendment Applicants have amended claims 7, 11, 33, 37 and 42, and have canceled claims 1, 12 to 14, 19 to 21, and 41. Claims 2 to 6, 8 to 10, 15 to 18, 22 to 32, 35, 36, 38 to 40, and 43 to 47 have earlier been canceled. Applicants have added new claims 48 to 52. Accordingly, upon entry of this Amendment Applicants submit that claims 7, 11, 33, 34, 37, 42, and 48 to 52 are properly pending.

Applicants believe that the above-noted pending claims are properly patentable over the prior art cited in the above-identified Office action for the reasons present below as follows:

I. Claims Rejection Under Section 103 Based on Sue, JP*301 and Nakamura

Claims 1, 7, 11, 12, 14, and 19-21 were earlier rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Sue, in view of JP*301 and Nakamura. Applicants have canceled independent claims 1 and 14, have canceled claims 19 and 21, and have rewritten claims 7 and 11 to depend from a different independent claim (claim 33), thereby obviating this basis of this earlier rejection.

II. Claims Rejection Under Section 103 Based on Sue, JP'301, Nakamura and JP'547

Claims 13, 33, 34, 37, 41 and 42 were earlier rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Sue, in view of JP'301, Nakamura and JP'547. Claims 13 and 41 have been canceled, obviating the rejection as to these claims. Independent claim 33 has been amended to include the feature that the cutting insert have an outer, formation engaging wear surface including the cermet material having the composition as recited therein, and that such cermet material has engineered properties of fracture toughness, thermal shock resistance, and wear resistance, making it specifically suited for its intended service.

Applicants submit that the subject matter recited amended independent claim 33 is properly patentable and nonobvious over the combination of Sue, JP'301, Nakamura, and LP'547 for the reasons presented below. Applicants will initially discuss the each reference independently, and then will discuss the references when taken in combination.

Applicants' rock bit as recited in independent claim 33 comprises a cutting element having an outer, formation engaging surface formed from a cermet material that consists of two and only two phases; namely, (1) a hard tungsten carbide (WC) phase that is bonded with, (2) a second phase of low CTE binder alloy comprising Fe, Co, Ni, C and Mn, wherein Co is present in the range of from 10 to 30 percent by weight of the total binder alloy. Applicants' claimed binder alloy is specifically engineered to provide a coefficient of thermal expansion that closely matches that of the WC as quantified in the claims. Such binder alloy operates to provide the combined properties of fracture toughness, thermal shock resistance, and wear resistance.

Sue discloses a composite construction having a first hard phase (comprising a cermet formed of WC-M, where M may be Co, Ni, Fe, W, Mo, Cu, Al, Nb, Ti, Ta, and alloys thereof, which is provided in the form of a core or sheet), and a second binder phase (formed from a material consisting of Co, Ni, Fe, W, Mo, Cu, Al, Nb, Ti, Ta, and alloys thereof, which is provided in the form of a shell or sheet disposed around or over the first phase). So in reality, Sue discloses a three-phase construction and not only a two-phase construction.

Contrary to the Examiner's position that Sue "reads on the cermet materials consisting of WC and binder alloy as recited in the instant claims", first off this only relates to a portion of the Sue construction and not the total construction of Sue that comprises three phases. Thus, Sue

fails to disclose a material “consisting only” of WC and a binder alloy. Secondly, while the hard phase in Sue arguably comprises WC and a ductile metal, Sue fails to disclose that the ductile metal can be an alloy as Applicants’ claimed binder alloy comprising Fe, Co, Ni, C and Mn. Sue simply fails to disclose that the ductile metal used with WC to form two of its three phases comprises blend that includes C or Mn. These are significant shortcomings in Sue, but it is not surprising that Sue fails to disclose or suggest the presence of such elements as Sue says nothing about matching the thermal expansion properties in its cermet first hard phase (of WC and M).

Two further shortcomings of Sue as admitted by the Examiner is that Sue fails to disclose or remotely suggest that the cermet material forming two of its three phases: (1) comprises 10 to 30 percent by weight binder alloy based on the total weight of the cermet material; and (2) that the binder alloy in the cermet first phase comprises 10 to 30 percent by weight Co.

Thus, the summary of Sue’s shortcomings is that: (1) it discloses a construction comprising three phases (not a construction “consisting of” only two phases); (2) the ductile metal disclosed in Sue for forming the cermet material does not include the binder alloy as recited in Applicants’ claims (i.e., it does not include C and Mn); (3) it fails to disclose 10 to 30 percent by weight of the binder alloy based on the total weight of the cermet material; and (4) it fails to disclose that the cermet material comprise 10 to 30 percent by weight Co. These are four significant shortcomings that clearly render Sue alone incapable of rendering Applicants’ cermet composition obvious or unpatentable as recited in independent claims 1 and 14.

Now Applicant will discuss JP ‘301 individually and then in combination with Sue.

The Examiner relies on JP ‘301 for its disclosure of a sintered article formed by combining a Super Invar powder with a ceramic powder. As earlier noted by the Examiner, JP ‘301 does not expressly disclose the use of WC. Additionally, the Super Invar powder disclosed in JP ‘301 (as set forth in Table 1) has a material composition that includes a unique combination of elements present in a particular amount; namely, 0.02 wt% C, 0.03 wt% Si, 0.15 wt% Mn, 0.005 wt% S, 0.001 wt% Cu, 31.83wt % Ni, 0.03 wt% Cr, 0.01 wt% Mo, and 5.0 wt% Co. Though not expressly disclosed in JP ‘301, for purposes of addressing this reference the remaining amount will be considered to be Fe.

In addition to JP'301's failure to disclose WC, JP'301 also fails to disclose a binder alloy comprising 10 to 30 percent by weight Co. The Super Invar of JP'301 comprises only 5 wt% Co.

The Examiner then asserts that JP'301 discloses that its sintered article can be used in power machine parts, an electronic device and measuring equipment such as IC boards, then relies on this intended use to somehow tie the subject matter of JP'301 to that of Sue, which discloses no such analogous uses. The composite construction of Sue is intended to be used with subterranean drilling and mining tools that has no relation whatsoever to electronic devices, measuring equipment and IC boards. For this reason, Applicants submit JP'301 discloses subject matter that is not analogous to Sue, and is not analogous to the subject matter recited in independent claim 33 (a drill bit and cutting elements) thus JP'301 is not properly combinable in the manner suggested by the Examiner.

Further, the Examiner next asserts that because of the alleged similarity in uses (that again is misplaced and does not exist), it would have been obvious for one having ordinary skill in the art to partially replace the Co binder of Sue with the Super Invar of JP'301. This is Applicants' argument regarding the combined teachings of Sue and JP'310. This position is improper on a number of levels. First, as noted above, Sue and JP'310 disclose nonanalogous subject matter so one having ordinary skill in the art of making drill bits or cutting elements (where properties of fracture toughness and wear resistance are desired) would have no motivation or reason to look to JP'310 and the field of electronic devices. Second, why would one skilled in the art be motivated to only "partially" replace the Co binder of Sue with the Super Invar of JP'301, and not "completely" replace the Co binder of Sue with the Super Invar of JP'301, i.e., why supplement rather than supplant (or completely replace) the Co? Complete replacement would be more logical (for purposes of argument), since you are replacing one binder for another.

Applicants' submit that the only reason that the Examiner is asserting "partial" replacement of Co in Sue is because JP'301 fails to disclose or suggest a Super Invar material having 10 to 30 percent by weight Co. While this approach is very creative, it is not one that is supported by any amount of motivation or suggestion in either Sue or JP'301, and it submitted as being nothing more than an improper hindsight reconstruction by the Examiner as a way at arriving at Applicants' claimed amount of Co. As misplaced as this argument is, Applicants still submit

that this still doesn't meet the recited feature of the Applicants' claim since Sue fails to disclose the amount of Co in its cermet phase. Thus, even the misplaced and improper partial combination of Sue and JP `301 as promoted by the Examiner does not meet this claim feature.

Thus, for all of the reasons noted above Applicants submit that its invention as recited in amended independent claim 33 is not rendered obvious or unpatentable based on the combination of Sue and JP `301.

Nakamura discloses a high-strength bonding tool comprising a shank, which tool is used for mounting a semiconductor device. While this subject matter may be related to that disclosed in JP `301, it is not analogous to the subject matter of Sue and the subject matter recited in Applicants' claim 33 (drill bit and cutting elements) as evidenced by the difference in US and International Classifications. Thus, Applicants submit the Nakamura is not properly combinable with Sue for this reason, i.e., being nonanalogous art.

Nakamura discloses that the tool comprises polycrystalline diamond-coated cemented carbide as the tool material. The cemented carbide tool material for this particular embodiment may include metals, alloys, and cemented carbide particles that include W, or Invar and Super Invar alloys. Nakamura does not disclose that the shank material "consist of" only two material phases; namely, a WC phase and a binder alloy phase. Nakamura does disclose the Super Invar alloy as having the following compositions: 64% Fe; 31% Ni, 5% Co, 0.3 to 0.4% Mn, and 0.07% C.

As noted above, Nakamura does not disclose a cermet composition "consisting of" only of a WC phase and a binder alloy phase, i.e. Nakamura does not preclude the existence of additional material phases. Further, the Super Invar material disclosed in Nakamura includes an amount of Co (5%) that is outside of the range (10 to 30%) recited in Applicants' claims. Thus, like JP `310, Nakamura fails to disclose or remotely suggest a binder alloy having the particular Co content (10 to 30 weight percent) as recited in the pending claims.

Further, the cemented carbide tool material in Nakamura is covered with polycrystalline diamond and does not form an outer formation engaging surface of a cutting element as recited in Applicants' claim 33.

Thus, combining JP `301 with Nakamura at most would yield a composition comprising WC as one phase (adding WC from Nakamura to replace the ceramic powder in JP `310) with the Super Invar (from Nakamura) as another phase. However, even this hypothetical combination outcome fails to provide a cermet composition (as recited in Applicants' claim) having a binder alloy phase that includes 10 to 30 percent by weight Co. This is neither disclosed nor suggested in either reference, so their combination cannot operate to provide motivation or suggestion for such claim feature that is missing in each. Further, neither JP `301 nor Nakamura disclose uses that are the even remotely similar to Sue or Applicants' claimed invention so one skilled in the art would not think to combine JP `310 and Nakamura with Sue.

JP `547 discloses a contact tool having a main body tool joined to a shank by a soldering material. This tool is useful for bonding an IC chip. Again, as noted above with respect to JP `301 and Nakamura, JP `547 discloses subject matter that is not analogous to the subject matter of Sue and of Applicants' claimed invention (drill bit and cutting elements), and for this reason is not properly combinable therewith, i.e., it is nonanalogous art. JP `547 (like JP `301 and Nakamura) fails to disclose or remotely suggest a cutting element having an outer, formation engaging surface formed from the cermet material as recited in independent claim 33.

The main body tool of JP `547 has a base made from 90 to 98 percent by weight WC with Co. The Examiner relies on the further combination of JP `547 (with Sue, JP `301 and Nakamura) as motivation for replacing the ceramic powder of JP `301 with WC, and replacing the Co in JP `547 with the Super Invar disclosed in JP `301 and/or Nakamura. This is nothing more than a hindsight reconstruction as nothing in these references provides any type or motivation or suggestion to one skilled in the art capable of supporting such a creative mixing and matching of invention features.

Further, the combined references fail to disclose or remotely suggest the claim feature of the binder alloy comprising 10 to 30 percent by weight Co, which feature is present in each of Applicants' independent claims 14 and 33.

Thus, for the reasons presented above, Applicants submit that one having ordinary skill in the art aware of Sue, JP `301, Nakamura and JP `547, and taking these references in combination

(which as presented above is not suggested by the widely different subject matter), would not be motivated to produce the invention comprising the invention features as recited in Applicants' amended independent claim 33. Accordingly, Applicants respectfully request that the earlier rejection of independent claim 33, and the claims depending therefrom, under 35 U.S.C. § 103(a) be reconsidered and withdrawn.

III. New Claims

Applicants are providing herewith new independent claims 48, 51 and 52. Applicants submit that the subject matter recited in these new claims is properly supported in the specification. Independent claim 48 recites cutting elements used with drill bits for drilling subterranean formations, wherein at least one cutting element has an outer, formation engaging wear surface formed from the cermet material as recited in claim 33. Independent claim 51 recites a rotary cone rock bit comprising cutting elements, wherein at least one cutting element has an outer, formation engaging wear surface formed from the cermet material as recited in claim 33. For the reasons presented above in Section II of this response, Applicants submit that subject matter as presented in new independent claims 48 and 51 is both novel and nonobvious over the references cited in the above-identified Office action.

Independent claim 52 recites cutting elements used with drill bits for drilling subterranean formations, wherein at least one cutting element is formed from a cermet material comprising the cermet material as recited in claim 33 plus an additional ductile phase. Applicants submit that none of the references cited in the earlier Office action taken alone or in combination disclose or remotely suggest this invention.

In view thereof, Applicants submit that the subject matter presented in new independent claims 48, 51 and 52 is properly patentable over the references cited in the above-identified Office action.

IV. Request for Telephone Interview

Should the Examiner believe that the claims now pending in this patent application are not in proper condition for allowance after consideration of this response, Applicants respectfully

request that the Examiner please contact its below-designated patent attorney for the purpose of conducting a telephone interview to discuss any remaining issues.

The proceedings herein are for a patent application and the provisions of 37 C.F.R. 1.136 apply. The Commissioner is authorized to charge any underpayment of fees, and to credit any overpayment of fees due, including extension of time fees, to Deposit Account No. 50-3683.

Respectfully submitted,

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